4-Aminobiphenyl (4-Aminodiphenyl) CAS No. 92-67-1

First Listed in the *First Annual Report on Carcinogens*

Carcinogenicity

There is sufficient evidence for the carcinogenicity of 4-aminobiphenyl in experimental animals (IARC V.1, 1972; IARC S.1, 1979; IARC S.4, 1982; IARC S.7, 1987). When administered by gavage, 4-aminobiphenyl induced carcinoma of the urinary bladder in mice and rabbits. When administered in the diet, 4-aminobiphenyl induced neoplasms at various sites, including dose-related increases in the incidence of angiosarcomas, in mice. When administered in the diet, the compound induced carcinoma of the urinary bladder in dogs. When administered by subcutaneous injection, 4-aminobiphenyl induced mammary gland and intestinal tumors in rats and hepatomas in newborn mice of both sexes.

An IARC Working Group reported that there is sufficient evidence for the carcinogenicity of 4-aminobiphenyl in humans (IARC V.1, 1972; IARC S.1, 1979; IARC S.4, 1982; IARC S.7, 1987). The extent of urinary bladder cancer risk associated with exposure to 4-aminobiphenyl was first documented by a descriptive study in which 19 of 171 men exposed to the compound developed urinary bladder tumors. In another survey of cancer mortality among workers at a chemical plant producing a variety of chemicals, a tenfold increase in mortality from urinary bladder cancer was reported.

Properties

4-Aminobiphenyl occurs as colorless or purplish crystals which darken upon oxidation. It is slightly soluble in cold water and soluble in hot water, non-polar solvents, and lipids. When heated to decomposition, it emits toxic fumes of nitrogen oxides (NO_x).

Use

4-Aminobiphenyl presently has no commercial use in the United States, although it was formerly used as a rubber antioxidant. The compound has also been used as a research chemical and as a reagent for detecting sulfates (Merck, 1983).

Production

4-Aminobiphenyl is no longer produced commercially in the United States. Chem Sources identified one bulk supplier of 4-aminobiphenyl among three listed for 1991. The 1979 TSCA Inventory identified one producer of 4-aminobiphenyl in 1977, but no volume was reported. From 1975 through 1977, EPA reported only one producer of 4-aminobiphenyl (TSCA, 1979).

Exposure

The primary routes of potential human exposure to 4-aminobiphenyl are dermal contact, ingestion, and inhalation. 4-Aminobiphenyl occurs as a contaminant in 2-aminobiphenyl, which is used in the manufacture of dyes. Consumers could possibly be exposed by ingesting foods with food additives containing trace amounts of 4-aminobiphenyl as a contaminant. OSHA estimated that approximately 130 workers are possibly exposed to 4-aminobiphenyl during the production of 2-aminobiphenyl. Also, mainstream cigarette smoke is reported to contain 4.6 ng/cigarette of 4-aminobiphenyl, while sidestream smoke contains 140 ng/cigarette of the chemical (Patrianakos & Hoffmann, 1979). The Toxic Chemical Release Inventory (EPA) listed one industrial facility that produced, processed, or otherwise used 4-aminobiphenyl in 1988 (TRI, 1990). In compliance with the Community Right-to-Know Program, the facilities reported releases of 4-aminobiphenyl to the environment which were estimated to total 14 lb.

Regulations

In 1980, CPSC preliminarily determined that 4-aminobiphenyl was not present in consumer products under its jurisdiction. CPSC subsequently requested public comment to verify the accuracy of its information, and no comments were received. Pending the receipt of new information, CPSC plans no action on 4-aminobiphenyl. EPA regulates 4-aminobiphenyl under the Resource Conservation and Recovery Act (RCRA) as a hazardous constituent of waste and under Title III of Superfund Amendments and Reauthorization Act (SARA). No reportable quantity (RQ) has been established for this compound as of July 1, 1996. FDA, under the FDCA, regulates 4-aminobiphenyl as a contaminant in food and color additives. FDA has published a listing of color additives certified for external uses, and regulates the level of 4-aminobiphenyl as a contaminant in these color additives. OSHA regulates 4-aminobiphenyl as a carcinogen with potential for occupational exposure. OSHA has issued a final standard requiring the use of exhaust fans, protective clothing, and respirators in work places where there is potential for exposure to 4-aminobiphenyl. OSHA regulates 4-aminobiphenyl as a chemical hazard in laboratories under the Hazard Communication Standard.